Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the matter of	)	
Targeted Changes to the Commission's Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields	)	**ET Docket No. 19-226**

COMMENTS FROM THE BALANCE GROUP REGARDING TARGETED CHANGES TO THE COMMISSION'S REGARDING HUMAN EXPOSURE TO RADIOFREQUENCY ELECTROMAGNETIC FIELDS

by the BALANCE GROUP

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I. SUMMARY

The BALANCE GROUP supports extending human RF exposure protections to 3,000 GHz (i.e., 3 THz) in the context of its other positions herein.

We are now at the threshold of being able to integrate the world's leading technologies, methods, and metrics for measuring RFR impacts. First, certified Spectrum Managers and others in that profession can conduct site surveys, provide RF exposure reports, and institute persistent RF measuring systems that will provide extensive details about the RF emissions experienced by individuals at places of work, play and residence. This should become standard protocol. Expert agencies, organizations and universities can assess these data.[1] This powerful synthesis of spectrum emission analysis with federal agencies and other organizations that have expertise in advanced engineering, biology, medicine, environmental health, and other fields will cause a Strategic Rebalancing toward a safe, secure, environmentally protective national and international communications infrastructure.

New or revised Specific Absorption Rate (SAR), Maximum Permissible Exposure (MPE) and internal electric field (Ei) rates, along with other measurement metrics and standards, may be required after thorough consultation with other agencies of jurisdiction.

Sadly, in the meantime, there is ample empirical evidence that: (1) no system currently exists for verifiably, systemically and continuously measuring the actual RF exposure impacts being experienced by U.S. citizens on a daily basis, (2) U.S. exposure limits as they currently stand, are being systemically violated by the everyday use of RF devices and networks already in the marketplace; (3) the mobile and WPT devices and networks in the short-term pipeline will

[1] One such example of subject-matter expertise is in the field of Clinical Electromagnetics.

exacerbate the systemic problems, absent new best-practice rules and guidelines from federal and local agencies and experts in the field, (4) numerous U.S. agencies of jurisdiction are either (i) effectively unaware of the systemic material issues in the NPRM, or (ii) underfunded and under resourced to address the matter, and (5) major industry players (smartphone device manufacturers, mobile operators, etc.) have yet to provide detailed evidence in this proceeding that they are adequately insured against systemic harm to the U.S. population and property caused by foreseeable conditions related to preventable RF exposure.

Under 47 CFR, which encompasses the operations of the FCC, and other codes of federal regulation, including and not limited to those governing the Food and Drug Administration (FDA), the Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), the National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA), the National Cancer Institute (NCI), the National Institute of Environmental Health Sciences (NIES), the National Toxicology Program (NTP), and others, it is now apparent that the NPRM evidences a *prima facie* case requiring that the issue of assessing harmful RF exposure must include, for the first time in U.S. history, the inter-agency reviews required by U.S. law. Those agencies must also include the consultations and deference required to U.S. Treaties and to the U.S. Constitution. Such deference is necessary to adequately consider the roles and powers of state, municipal, tribal and international authorities.

The regulatory agencies overseeing the potential impacts of approving or assessing the deployment of RF devices and networks hold a heightened duty of care and vigilance, pursuant to domestically and internationally recognized precautionary principles. The BALANCE GROUP[2] Comments, including material issues listed herein, are meant to be useful to the Federal

[2] The BALANCE GROUP is designed to provide counsel and technical systems and solutions to individuals, non-profits, corporations, and governments. Its mission is to ensure that satellite and terrestrial broadband and other

Communications Commission, the public, and the public's additional representatives in assessing material issues of security, health, safety and welfare, related to approving, funding, insuring, constructing, regulating, and operating RF emitting networks and devices.

Critical information is missing. The missing information includes and is not limited to matters of: national security; environmental impacts; proof that device manufacturers and carriers have guaranteed that suitable insurance and indemnification exists against a number of material and readily-identifiable systemic and catastrophic harms; evidence that written assessments, and permissions were secured from other federal agencies that have subject matter jurisdiction of potential or actual RF exposure harms caused to people, property and other life forms (including and not limited to livestock, crops, trees, and other food production sources).

radio-frequency transmission networks and technologies are proven, through peer-reviewed science, to not pose a material risk of systemic harm to human beings or the environment both prior to being approved for deployment and also during their operational and post-operational phases.

II. BACKGROUND & SCOPE

In the instant Notice of Proposed Rulemaking (NPRM), the FCC "seeks comment on the Commission's proposals to apply radiofrequency (RF) exposure limits in additional frequency ranges beyond those currently specified in the Commission's RF exposure rules; on applying localized exposure limits above 6 GHz, in parallel with the existing localized exposure limits below 6 GHz; on specifying the conditions and methods for averaging RF exposure, in both time and area, during evaluation for compliance with the rules; and on addressing new issues raised by WPT devices."[3]

Methods for assessing human RF exposure are open for review, including and not limited to: Specific Absorption Rate (SAR), Maximum Permissible Exposure (MPE) and internal electric field (Ei) rates. New views are welcomed, for example on clinical studies on the impacts and triggers for RF initiated oxidative stress.

Previously, the Commission amended its rules related to the methods that may be used for determining and achieving compliance with the Commission's existing limits on human exposure to radiofrequency (RF) electromagnetic fields.[4] The Commission stated that amended rules are intended to provide more efficient, practical, and consistent RF exposure evaluation procedures and mitigation measures to help ensure compliance with the existing RF exposure limits.[5]

[3] See: 85 FR 19117 (April 6, 2020). WPT is the acronym for Wireless Power Transfer devices.

[4] See: 85 FR 18131 (April 1, 2020), Second Report and Order, Memorandum Opinion and Order, and Termination of Notice of Inquiry, ET Docket No. 03-137, ET Docket No. 13-84, FCC 19-126, adopted November 27, 2019, and released December 4, 2019.

[5] Note that some of the rules' effective dates have been delayed. See, 85 FR 33578 (May 29, 2020). "Effective May 29, 2020, the effective date of the amendments to 47 CFR 1.1307, 2.1091, 2.1093 (amendatory instructions 2, 7, and 8), published at 85 FR 18131, April 1, 2020, is delayed indefinitely. We will publish a document in the Federal Register announcing the effective date."

III. ISSUES

1. Expanding Human RF Exposure Protections to up to 3 THz. Paragraphs 1, 3 and 7, of the NPRM contain a proposal for expanding the human RF exposure protections to 3 THz. For example:

> "This NPRM seeks comment on the Commission's proposals to apply RF exposure limits in additional frequency ranges beyond those currently specified in the Commission's RF exposure rules; on applying localized exposure limits above 6 GHz, in parallel with the existing localized exposure limits below 6 GHz; on specifying the conditions and methods for averaging RF exposure, in both time and area, during evaluation for compliance with the rules; and on addressing new issues raised by WPT devices."[6]

The BALANCE GROUP supports protections expanding up to 3 THz, in the context of its comments herein.

2. Rely on More Established Studies & Dosimetry: Paragraph 4 in the NPRM. Here, and elsewhere in the NPRM, the FCC notes is relying on and effectively only aware of three RF health standards:

> "The Commission is aware of three existing guidelines for RF exposure that extend to frequencies below 100 kHz: International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for Limiting Exposure to Time-Varying Electric and Magnetic Fields (1Hz—100 kHz) (2010); Institute of Electrical and Electronic Engineers, Inc. (IEEE) Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz (IEEE Std C95.1–2005) and Standard for Safety Levels with Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz (IEEE Std C95.1–2019); and Health Canada Safety Code 6—Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3 kHz to 300 GHz (2015). While these guidelines are aimed at prevention of electrostimulation due to electric fields induced internally within the human body in the presence of an external electromagnetic field outside the body and have similar values for limiting the internal electric field (Ei), they have different approaches to the dosimetry used to derive their respective MPE limits on external fields from those Ei values. The Commission seeks comment on the significance of the difference between these guidelines."

[6] NPRM at para. 1.

As a practical matter there are many more RF health standards, and those standards have a superior clinical and peer-review history as compared to the ones the FCC cites. One key reason is that the FCC, ICNIRP[7], IEEE and Health Canada Safety Code 6 processes lack serious, documented funding and peer-reviewed consideration from the full battery of other federal health, safety, environmental and defense agencies and institutions available to the modern world. Countries with arguably more thoroughly vetted standards include and are not limited to the French and Belgian standards.[8] Even those more advanced review processes have missed an extraordinary array of material issues as recounted herein.

3. Localized Exposure Limits for Higher Frequencies Must Reflect Biological Impacts, and Also Be Tethered to Whether Device Manufacturers and Wireless Operators are Insured Against Serious RF Exposure Harms to U.S. Citizens and Property.

It is noted in the NPRM at para. 8 and elsewhere that a wide variety of new technologies are now in marketplace or intended for launch in the near-term.[9] It is clear that producer and operators of the vast array of those new devices and networks have not been represented as being insured against systemic RF exposure harms to the public, to property and to the environment.

[7] NPRM at para. 5-6 also cites heavy FCC reliance on ICNIRP.

[8] See generally, Environmental Health Trust (EHT).

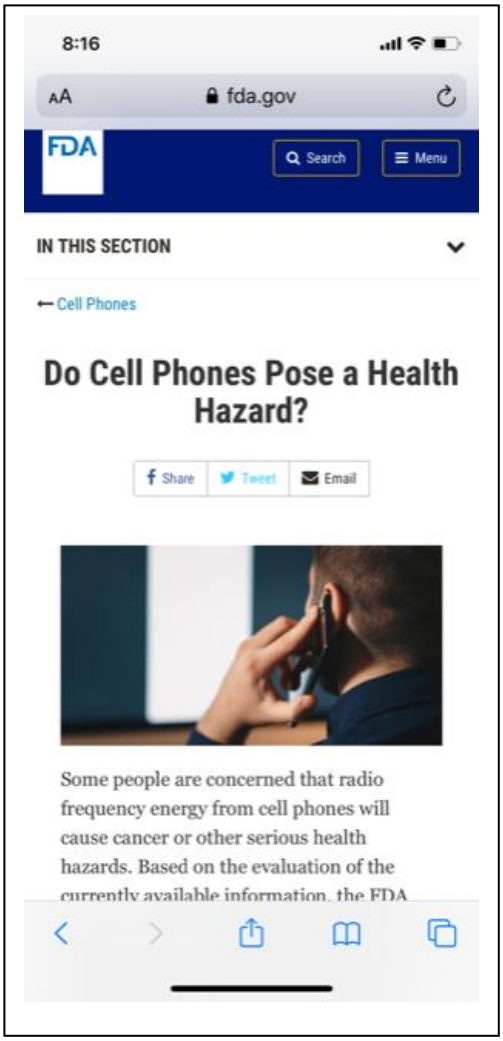
[9] NPRM at para. 8: "New technologies that employ techniques such as adaptive array antennas created by fluctuating multibeam sources create complex energy fields that present challenges for current RF measurement methods. Because portable devices are being developed for operation at higher frequencies for future 5G services, the Commission proposes a localized exposure limit above 6 GHz of 4 mW/cm2 averaged over 1 cm2 for the general population, applicable up to the upper frequency boundary of 3 THz, and seeks comment on this proposal. The Commission notes that both the ICNIRP guidelines and the IEEE standards specify a spatial maximum power density of 20 times the whole-body MPE limit (e.g., between 3 and 10 GHz), generally averaged over 1 cm2. The Commission proposes a localized exposure limit above 6 GHz for occupational settings of 20 mW/cm2 averaged over 1 cm2, which is consistent with the typical ratio of 5:1 for the occupational limits relative to the general population limits. The Commission tentatively concludes not to adopt an extremity limit at this time."

The FCC and other federal agencies of jurisdiction should require such representations of adequate insurance.

Under 47 CFR, which encompasses the operations of the FCC, and other codes of federal regulation, including and not limited to those governing the Food and Drug Administration (FDA), the Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), the National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA), the National Cancer Institute (NCI), the National Institute of Environmental Health Sciences (NIES), the National Toxicology Program (NTP), and others, it is now apparent that the NPRM evidences a *prima facie* case requiring that the issue of assessing harmful RF exposure must include, for the first time in U.S. history, the inter-agency reviews required by U.S. law. Those agencies must also include the consultations and deference required to U.S. Treaties and to the U.S. Constitution. Such deference is necessary to adequately consider the roles and powers of state, municipal, tribal and international authorities.

The regulatory agencies overseeing the potential impacts of approving or assessing the deployment of RF devices and networks hold a heightened duty of care and vigilance, pursuant to domestically and internationally recognized precautionary principles. Requiring that RD device manufacturers and wireless network operators and related providers possess adequate insurance against systemic RF exposure harms to the public, is a baseline requirement.

FOOD & DRUG ADMINISTRATION WEBSITE



Personal Electronic Dosimeter (PED+) – Tracerco
http://www.peo-radiation-technology.com/en/product/personal-electronic-dosimeter-ped-tracerco/

At present the wireless industry has yet to divulge evidence of adequate insurance against large-scale harms to the public due to RFR exposure, and it should do so for operations in the spectrum bands at issue in this proceeding. At such, if such insurance does not exist, the industry is operating on the presumption that should large-scale, systemic harms from RFR exposure be judged payable and of an amount the industry cannot afford to pay, then the burden must be borne by the public ("Public Pays Principle"). This Public Pays Principle is profoundly inequitable and contrary to leading economic theory, affirmed by the Organization for Economic Cooperation and Development (OECD) in 1972 that the health, environmental, and other costs must be "internalized" as a business expense by industries that are imposing them on an unwary and unconsenting public ("Polluter Pays Principle"). By considering establishing a new and more stringent standard the FCC and other concerned federal agencies are restoring a reasonable balance between the interests of a specific industry, i.e. the wireless industry, and that of the general public.

The Food and Drug Administration (FDA), the Environmental Protection Agency (EPA), the U.S. Department of Agriculture (USDA), the National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA), the National Cancer Institute (NCI), the National Institute of Environmental Health Sciences (NIES), the National Toxicology Program (NTP), and other should be actively petitioned by the FCC to submit peer-reviewed studies, and studies through their own notice and comment proceedings. See ATTACHMENT A, for examples of agency roles.

Federal Agencies: Human RF Exposure

FDA: The Food and Drug Administration's Cell phone website : http://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/
There are many pages listed at the FDA web site. Topics include:

- Wireless medical devices.
- General Electronic Product Radiation Control.
- FDA regulations that apply to manufacturers of electronic products

EPA: The Environmental Protection Agency's overview of power-line emissions: http://www.epa.gov/radtown/power-lines.html.

- Power lines:
- Cell phone safety:

OSHA: The Occupational Safety and Health Administration's Health and Safety Topics Non-ionizing Radiation.
NIOSH: The National Institute for Occupational Safety and Health's research on protecting workers from proven and possible EMF (electric and magnetic fields) health risks focusing on RF (radiofrequencies), ELF (extremely low frequencies) and Static magnetic fields: http://www.cdc.gov/niosh/topics/emf.
NCI: The National Cancer Institute's Fact sheets on potential risks from exposure to:

- Magnetic fields: http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/magnetic-fields-fact-sheet
- Cell phones: http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/cell-phones-fact-sheet.

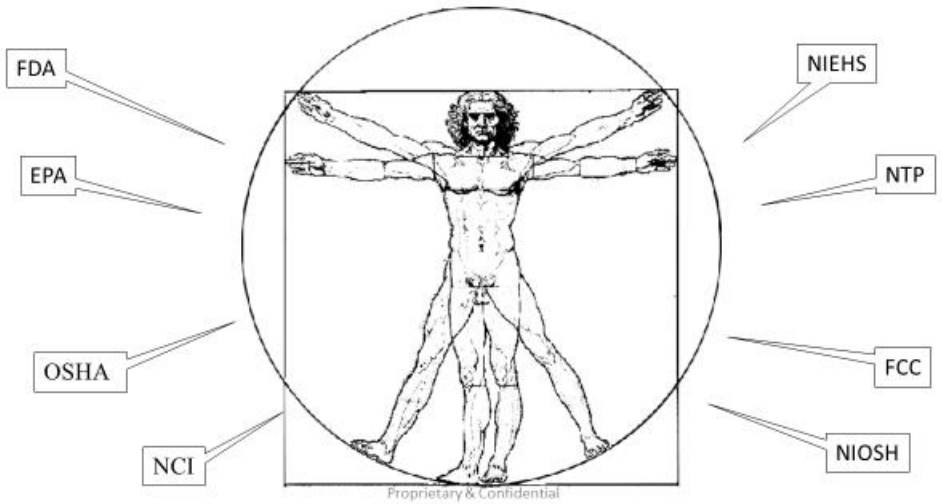
NIEHS: The National Institute of Environmental Health Sciences' main page for electric and magnetic fields and potential health effects: http://www.niehs.nih.gov/health/topics/agents/emf/index.cfm
NTP: The National Toxicology Program's studies that:

- Test the biological effects of cellphones (GSM): http://ntp.niehs.nih.gov/testing/status/agents/ts-08013.html
- Test the biological effects of cellphones (CDMA): http://ntp.niehs.nih.gov/testing/status/agents/ts-08015.html

FCC: Questions regarding potential RF hazards from FCC-regulated transmitters can be directed to the Federal Communications Commission, Consumer & Governmental Affairs Bureau, 445 12th Street, S.W., Washington, D.C. 20554; Phone: 1-888-225-5322 (1-888-CALL-FCC); E-mail: rfsafety@fcc.gov .

Oxidative Stress: What is the RFR Impact?

Federal agencies of jurisdiction must conduct thorough rulemakings & research



4. Continuous Monitoring and Enforcement. The FCC must establish procedures for the continuous monitoring, metering and enforcement of its Human RF exposure (thermal) standard. There is compelling evidence that this is not occurring. The present situation is worse for all involved parties than having no standard at all. Telecommunications service providers and the public both are unprotected by an unenforced and unmetered standard as a shield to cover liabilities and harms associated with noncompliant Radio Frequency Radiation (RFR). Verifiable, continuously reported, RFR data using professional-grade, certified Spectrum Management procedures and tools is required.

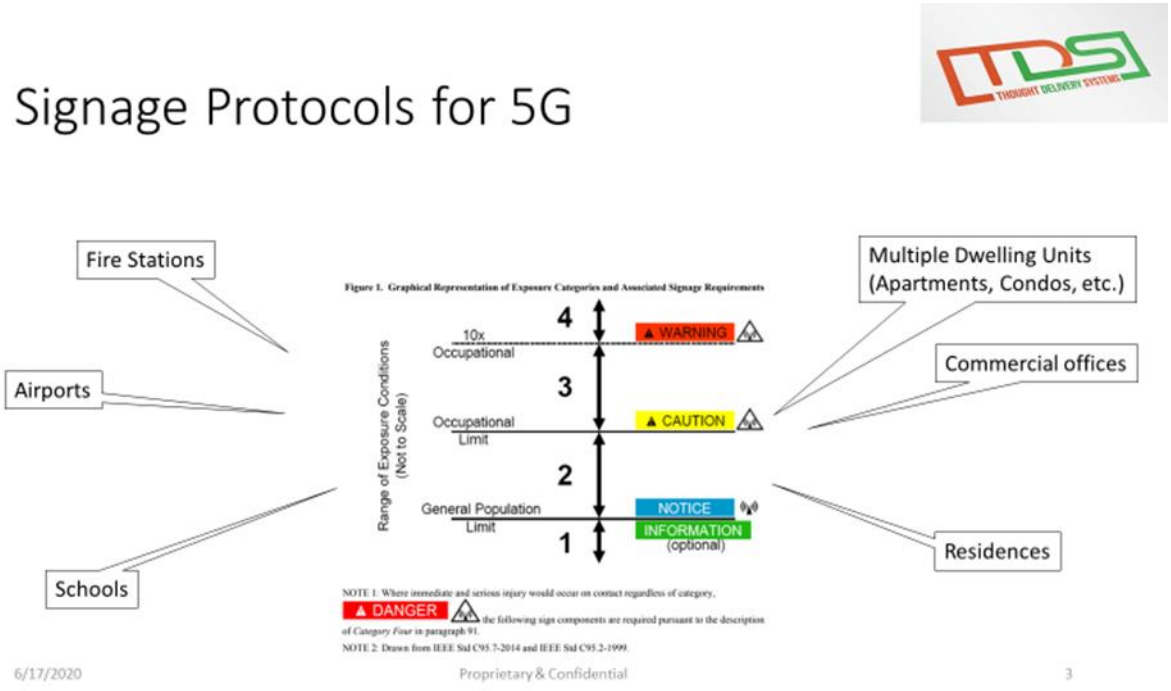
As a practical matter, as the FCC has admitted, it is not continuously monitoring and thus not in a position to effectively flag and enforce localized or systemic violations of the thermal Human RF exposure standard.[10] On its website, the FCC states that it "lacks the resources" to test wireless facilities. (See Does the FCC routinely monitor radiofrequency radiation from antennas?).[11] It is only in the rarest of instances that the FCC actually enforces the general

[10] See: ATTACHMENT A: SELECTIONS FROM THE FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY SAFETY "FREQUENTLY ASKED QUESTION" (FAQ). WEBLINK: https://www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/rf-safety#Q24 , (Last viewed, June 17, 2020).

[11] Id. "The FCC does not have the resources or the personnel to routinely monitor the exposure levels due at all of the thousands of transmitters that are subject to FCC regulation . . . In addition, the FCC does not routinely perform

population exposure cases, those being cases within which both {a} the agency has received a complaint of a facility exceeded the general population exposure limits, and {b} the owner/operator of such facility has "willfully and repeatedly" violated those limits. See e.g. In the Matter of T-Mobile License LLC, FCC File No. : EB-FieldWR-15-00018431, decision adopted November 12, 2015, and In the matter of Wirelessco LP, FCC File. No. EB-FieldWR-15-00018433, decision adopted November 12, 2015.

Because 5G base stations use up to 3-times more power than 4G base stations, and because many 5G base stations will be situated much closer to the ground and in thousands of additional locations, there must be appropriate RF exposure signage posted. All the expert federal agencies should assess where and when posted warnings may be required.



RF exposure investigations unless there is a reasonable expectation that the FCC exposure limits may be exceeded."

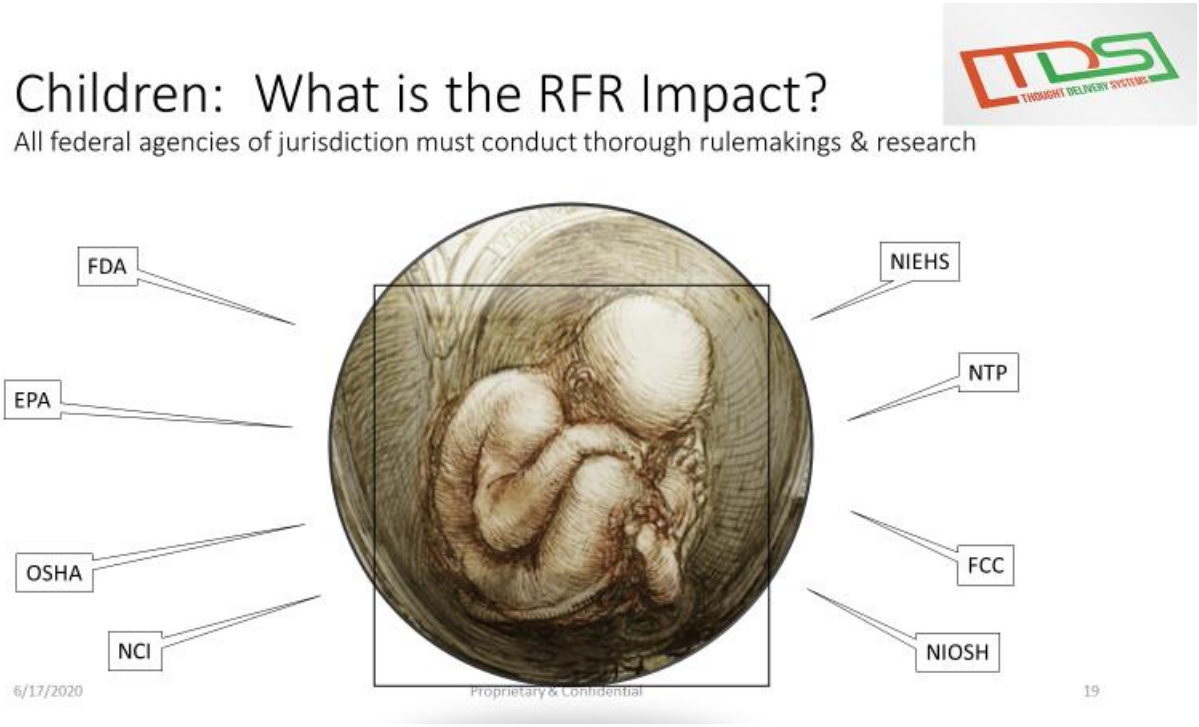
5. Available Clinical Evidence & Especially Vulnerable or Exposed Populations. Present FCC standards do not currently address, and new standards must account for numerous crucial elements, including and not limited to:

- All forms of cancer,
- Epidermal, optical, and major organ degradation,
- Headaches,
- RFR and oxidative stress,
- RFR and inflammation,
- RFR and DNA and mitochondrial damage,
- Compromised immunity and resilience,
- Psychiatric effects, especially associated with sleep deprivation and clinical depression,
- Continuous and chronic exposure,
- Negative synergistic effects,
- Aggregate effects from multiple RFR sources,
- Community-wide effects,
- Timing and duration effects,
- Pulsing effects,
- Phase effects, and
- Magnetic field effects combined with RFR exposure.

These factors must not be assessed only as to the ‘average adult male’, but also specifically to especially vulnerable populations, including and not limited to:

- Children,
- Elderly persons,
- Pregnant women,
- People with chronic illnesses or conditions,

- People with recognized disabilities,
- Minority and economically disadvantaged communities for whom there is little or no affordable mechanisms of defense or escape from harmful RFR exposure.

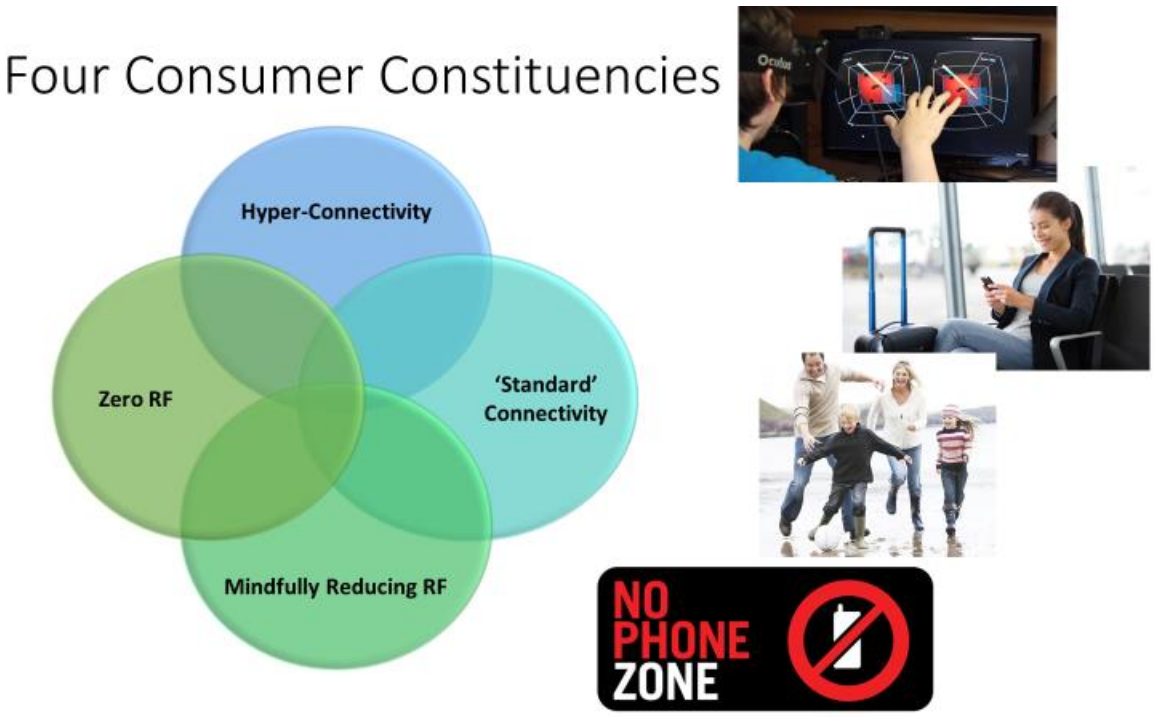


The new standard must also take special account occupations that are especially vulnerable to RFR exposure whose services are critical to national security. This is especially at issue during the present Corona pandemic, and includes and is not limited to the following occupations:

- Physicians, nurse, administrators and other healthcare workers in hospitals, nursing homes, and clinics,
- Firefighters, ambulance personnel and law enforcement,
- Pilots,
- Operators of nuclear power plants, toxic chemical factories, and other high-risk facilities.

6. Other Differences Among Populations: It is also important to measure differences within similarly situated populations. Some people with otherwise similar 'profiles' may have vastly different reactions, physical, philosophical or psychological, to different RF exposure levels.

Some populations cannot get enough exposure to wireless products and services. Others are fine with the latest generation of offerings. Still others wish to mindfully limit their exposure. Finally, a fourth group prefers no, or almost no exposure to man-made RF transmissions.



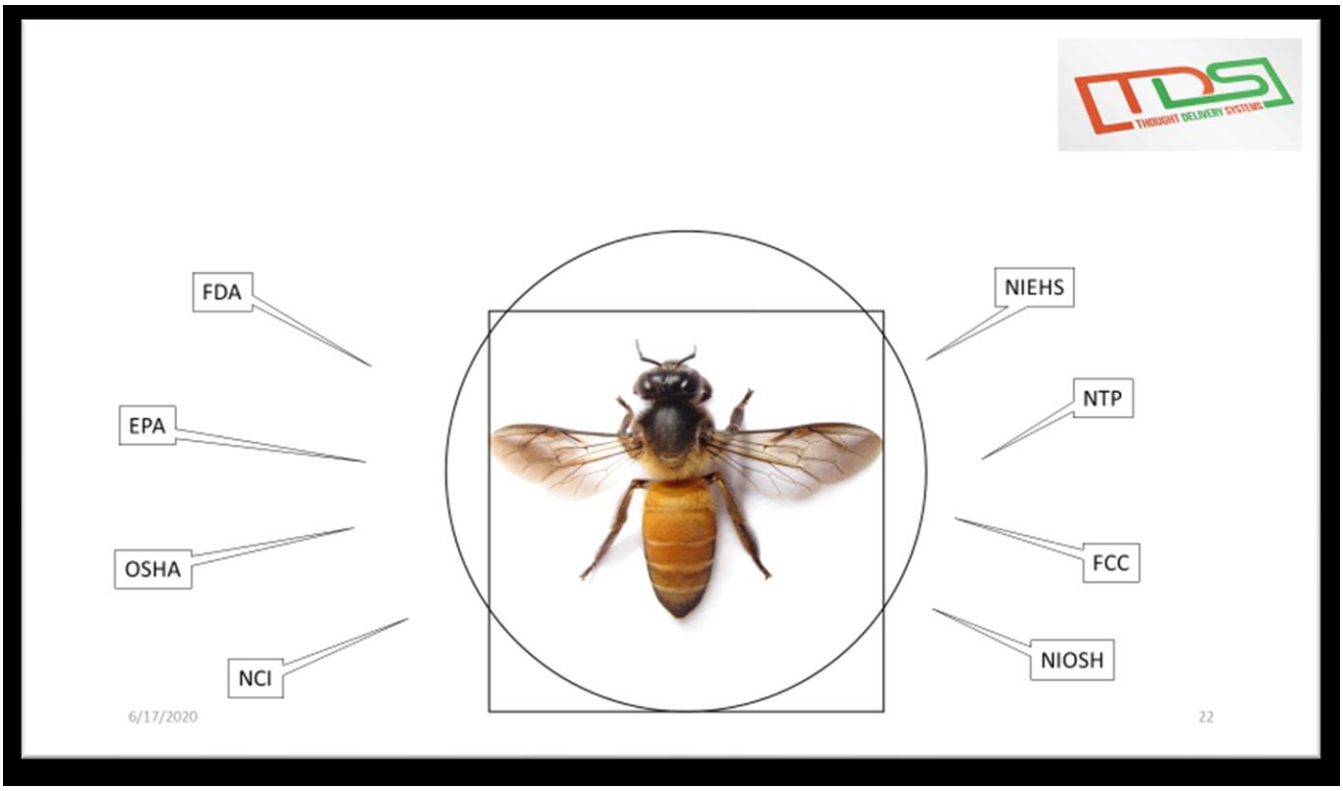
7. Radiation Hazard Report (RHR) for RFR Exposures from Satellites. A new FCC standard must make explicit the current requirement that all companies seeking permits for the launch and deployment of non-geostationary satellites and linked base and earth stations must prepare RHRs not only on the release of RFR from terrestrial devices, but also assessing the cumulative effects from the satellites and their associated base-stations.

8. Insurance and Indemnification. Mobile telecommunications device manufacturers and sellers, Wireless Power Transfer (WPT) device manufacturers and sellers, wearable communications system manufacturers and sellers, and the network operators and infrastructure industries and

landowners that host base stations, should insured against RFR harms to the public. A new standard must require companies seeking for permits or licenses of cell towers, base and earth stations, and other significant emitters of RFR, including non-geostationary satellites, to provide certification of adequate RFR insurance and contractual obligation to indemnify permitting local, state, and federal agencies and the U.S. for all harms associated with RFR exposure.

9. Measuring RFR Exposure to Additional Species Populations. RFR exposure site surveys and assessments are routinely conducted at industrial, commercial, residential, mobile, terrestrial and marine vessel locations. In other words, RFR exposure can be assessed nearly everywhere on the planet. A new standard must recognize and reflect the scientific fact that all living creatures in addition to humans, including farm animals, farm produce, trees, insects, terrestrial and marine species, are themselves bio-electrical transceivers. The RFR exposure to these populations can often be accurately and precisely measured at their locations using conventional instruments, protocols, and procedures developed and administered by certified spectrum managers.[12] The data can then be shared with subject-matter experts at agencies, organizations, universities and other institutions. Those experts can then assess the impact of the professionally measured RFR exposure levels to those specific populations and species.

[12] See generally, National Spectrum Management Association, www.NSMA.org ; More specifically see: https://nsma.org/wp-content/uploads/2019/05/5g-and-green-earth-initiatives.pdf; See also https://youtu.be/q1R0A2pKP28



10. Negotiated Rulemaking and Interagency Consultation. The FCC must adopt established best practices of negotiated rulemaking which require the agency to consult closely with all other federal agencies whose jurisdiction and missions concerning public health, wellness, and national security will be significantly affected by the FCC's decisions relating to the implementation of terrestrial and satellite-based wireless infrastructure.

11. Reform the FCC Record Keeping System for RFR Exposure & Other Health Matters. Presently, the FCC data management and public recording keeping systems relating to RFR exposure are not organized and resourced in a manner suitable to the task. Important records are not recoverable. Basic search functions that are standard throughout the world do not

exist on the FCC website. Information that is recoverable is often incomplete and not sortable. The current situation makes it virtually impossible for other federal agencies, let alone members of the public, to obtain important and timely information.[13] Reform the FCC record keeping system for RFR exposure and other health matters, so that records are readily recoverable, and sortable.

12. Start Methodically Reviewing Best-In-Class Standards

The FCC proposal does not address that many other nations whose health care agencies have been far more involved in sustain RF exposure research than U.S. agencies, have also proposed more stringent approaches to RFR especially regarding children.[14]

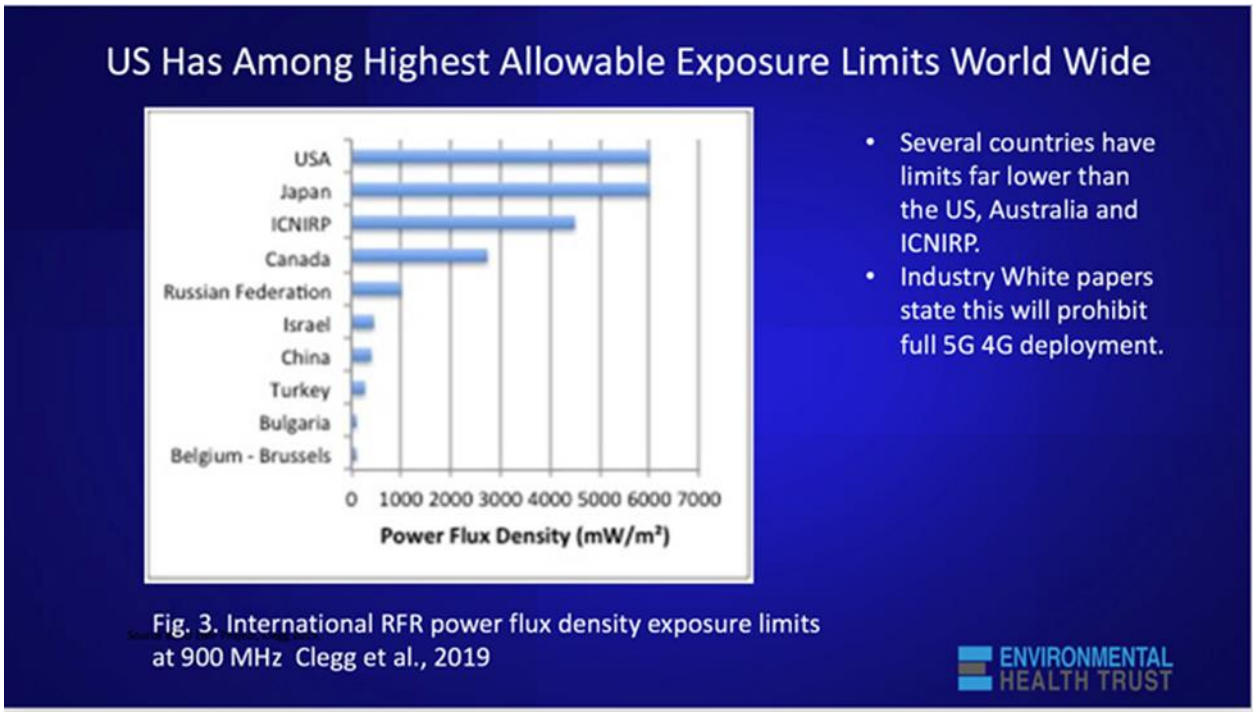
[13] Findings by an EHT and BALANCE GROUP research team reached the following assessment:

"It is clear from trying to analyze the filings of interest on the FCC ECFS website that there have been multiple iterations to the filing system over the years, and not all of the data has been appropriately updated (that is, recoded to match the changes as they were made.) If the site itself were useful, then that would not be a problem, but it is nearly impossible to use the tools on the FCC website to locate documents of interest. There is no useful content search capability within the site (for example, you might want to search for a document with a specific phrase in it.) There is no way to download all of the documents and their contextual data except either piecemeal (100 items or less) or through the API. However, the API is (1) not documented accurately, and (2) has links to documents and content that is not where it supposed to be (e.g. links to servers which are no longer in use by the FCC.) The only partially useful means of locating all the content related to a proceeding we found was to download a CSV file, but unfortunately that format lacked any of the meta-data associated with the records, and no unique identifiers except for the submission ID. And, it provides no easy way to download the documents associated with the filing. We have talked with researchers who submitted documents to the system, and at some point they were no longer able to find even their own contributions. Some files are missing, some corrupted, some named with the exact same filename making them difficult to download, and stored with filenames illegal in most operating systems making them difficult to download. In short, the data system is mostly useless for a researcher interested in locating information or examining documents that have been submitted. It makes one wonder how anyone at the FCC was able to conduct any review of the submissions to evaluate evidence of safety for the proposed regulations."

[14] According to the Environmental Health Trust:

- The exposure limits in Belgium, China, Cyprus, France, Italy, Russia, Switzerland, and others are more protective of RF exposure to humans than in the U.S. In some cases, the RF exposure limits are 10-to-100 times lower than those in use or proposed by the FCC.
- France - the Agency for Food, Environmental and Occupational Health & Safety (ANSES) has continued to carry out studies of phones in the real world under real world exposures that simulate phones stored in the pocket or on the body. France has banned Wi-Fi in kindergarten and restricts Wi-Fi in school by having the wireless off as the default setting. Teachers have wired (not wireless) computers for internet

Many current national safety standards are more stringent than those recommended by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The FCC must not overly rely on ICNIRP recommendations.



The FCC must seriously review the standards and research of recognized experts from a wider and more balanced and readily available pool. Knowledge from other organizations, lab,

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access. The country launched public health initiatives on how to reduce cell phone radiation exposure years ago.

- Israel – Israel has banned Wi-Fi in nursery schools, restricted Wi-Fi in elementary schools, banned cell phones in classrooms and have a national agency educating citizens on how to reduce cell phone radiation. In 2016, the mayor of Haifa called for wired networks in lieu of wireless in schools.
- Cyprus - Cyprus has also removed Wi-Fi from elementary classrooms and have a strong public awareness campaign educating parents, teenagers and pregnant women.
- Belgium - Banned cell phones manufactured for young children.
- Italy - Mayors of several Northern cities as well as some of the Districts of Rome have long called for wired networks to replace Wi-Fi networks in schools in cities such as Borgofranco d'Ivrea, Italy.
- French Polynesia - they have also removed Wi-Fi from nursery schools and like Cyprus, launched a major public health campaign.

universities, and countries is needed to be carefully reviewed in order to synthesize the best-in-class information, assessments and recommendations by other heretofore largely ignored leading scientists.

CONCLUSION

For the reasons outlined herein, the BALANCE GROUP requests the Commission to adopt the recommendations outlined in the comments herein.

Respectfully submitted,

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ATTACHMENT A: SELECTIONS FROM THE FEDERAL COMMUNICATIONS COMMISSION RADIO FREQUENCY SAFETY "FREQUENTLY ASKED QUESTION" (FAQ). WEBLINK: https://www.fcc.gov/engineering-technology/electromagnetic-compatibility-division/radio-frequency-safety/faq/rf-safety#Q24 , (Last viewed, June 17, 2020)

WHAT IS THE FCC'S POLICY ON RADIOFREQUENCY WARNING SIGNS? FOR EXAMPLE, WHEN SHOULD SIGNS BE POSTED, WHERE SHOULD THEY BE LOCATED AND WHAT SHOULD THEY SAY?

Radiofrequency warning or alerting signs should be used to provide information on the presence of RF radiation or to control exposure to RF radiation within a given area. Standard radiofrequency hazard warning signs are commercially available from several vendors. Appropriate signs should incorporate the format recommended by the Institute for Electrical and Electronics Engineers (IEEE) and as specified in the IEEE standard: IEEE Std C95.2-1999 (Web address: http://www.ieee.org). Guidance concerning the placement of signs can be found in the IEEE Standard: IEEE Std C95.7-2005 (available for free through the IEEE Get Program). When signs are used, meaningful information should be placed on the sign advising affected persons of: (1) the nature of the potential hazard (i.e., high RF fields), (2) how to avoid the potential hazard, and (3) whom to contact for additional information. In some cases, it may be appropriate to also provide instructions to direct individuals as to how to work safely in the RF environment of concern. Signs should be located prominently in areas that will be readily seen by those persons who may have access to an area where high RF fields are present. (Back to Index)

CAN IMPLANTED ELECTRONIC CARDIAC PACEMAKERS BE AFFECTED BY NEARBY RF DEVICES SUCH AS MICROWAVE OVENS OR CELLULAR TELEPHONES?

Over the past several years there has been concern that signals from some RF devices could interfere with the operation of implanted electronic pacemakers and other medical devices. Because pacemakers are electronic devices, they could be susceptible to electromagnetic signals that could cause them to malfunction. Some anecdotal claims of such effects in the past involved emissions from microwave ovens. However, it has never been shown that the RF energy from a properly operating microwave oven is strong enough to cause such interference.

Some studies have shown that mobile phones can interfere with implanted cardiac pacemakers if a phone is used in close proximity (within about 8 inches) of a pacemaker. It appears that such interference is limited to older pacemakers, which may no longer be in use. Nonetheless, to avoid this potential problem, pacemaker patients can avoid placing a phone in a pocket close to the location of their pacemaker or otherwise place the phone near the pacemaker location during phone use. Patients with pacemakers should consult with their physician or the FDA if they believe that they may have a problem related to RF interference. Further information on this is available from the FDA: http://www.fda.gov/Radiation- EmittingProducts/. (Back to Index)

DOES THE FCC REGULATE EXPOSURE TO THE ELECTROMAGNETIC RADIATION FROM MICROWAVE OVENS, TELEVISION SETS AND COMPUTER MONITORS?

The Commission does not regulate exposure to emissions from these devices. Protecting the public from harmful radiation emissions from these consumer products is the responsibility of

the U.S. Food and Drug Administration (FDA). Inquires should be directed to the FDA's Center for Devices and Radiological Health (CDRH), and, specifically, to the CDRH Office of Compliance at (301) 594-4654. (Back to Index)

DOES THE FCC ROUTINELY MONITOR RADIOFREQUENCY RADIATION FROM ANTENNAS?

The FCC does not have the resources or the personnel to routinely monitor the exposure levels due at all of the thousands of transmitters that are subject to FCC jurisdiction. However, while there are large variations in exposure levels in the environment of fixed transmitting antennas, it is exceedingly rare for exposure levels to approach FCC public exposure limits in accessible locations. In addition, the FCC does not routinely perform RF exposure investigations unless there is a reasonable expectation that the FCC exposure limits may be exceeded. (Back to Index)

DOES THE FCC MAINTAIN A DATABASE THAT INCLUDES INFORMATION ON THE LOCATION AND TECHNICAL PARAMETERS OF ALL OF THE TRANSMITTER SITES IT REGULATES?

The FCC does not have a comprehensive, transmitter-specific database for all of the services it regulates. However, the FCC does have information for some services such as radio and television broadcast stations, and many larger antenna towers are required to register with the Antenna Structure Registration (ASR) database if they meet certain criteria. In those cases, location information is generally specified in terms of degrees, minutes, and seconds of latitude and longitude. In some services, licenses are allowed to utilize additional transmitters or to increase power without notifying the FCC. Other services are licensed by geographic area, such that the FCC has no knowledge concerning the actual number or location of transmitters within that geographic area.

The *FCC General Menu Reports* (GenMen) search engine unites most of the FCC's licensing databases under a single umbrella. Databases included are the Wireless Telecommunications Bureau's ULS, the Media Bureau's CDBS, COALS (cable data) and BLS, and the International Bureau's IBFS. Entry points or search options in the various databases include frequency, state/county, latitude/longitude, call sign and licensee name.

The FCC also publishes, generally on a weekly basis, bulk extracts of its various licensing databases. Each licensing database has its own unique file structure. These extracts consist of multiple, very large files. OET maintains an index to these databases.

OET has developed a *Spectrum Utilization Study Software* tool-set that can be used to create a Microsoft Access version of the individual exported licensing databases and then create MapInfo mid and mif files so that radio assignments can be plotted. This experimental software is used to conduct internal spectrum utilization studies needed in the rule-making process. While the FCC makes this software available to the public, no technical support is provided. (Back to Index)

WHICH OTHER FEDERAL AGENCIES HAVE RESPONSIBILITIES RELATED TO POTENTIAL RF HEALTH EFFECTS?

Certain agencies in the Federal Government have been involved in monitoring, researching or regulating issues related to human exposure to RF radiation. These agencies include the Food and Drug Administration (FDA), the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), the National Telecommunications and Information Administration (NTIA) and the Department of Defense (DOD).

By authority of the Radiation Control for Health and Safety Act of 1968, the Center for Devices and Radiological Health (CDRH) of the FDA develops performance standards for the emission of radiation from electronic products including X-ray equipment, other medical devices,

television sets, microwave ovens, laser products and sunlamps. The CDRH established a product performance standard for microwave ovens in 1971 limiting the amount of RF leakage from ovens. However, the CDRH has not adopted performance standards for other RF-emitting products. The FDA is, however, the lead federal health agency in monitoring the latest research developments and advising other agencies with respect to the safety of RF-emitting products used by the public, such as cellular and PCS phones.

The FDA's microwave oven standard is an emission standard (as opposed to an exposure standard) that allows specific levels of microwave energy leakage (measured at five centimeters from the oven surface). The standard also requires ovens to have two independent interlock systems that prevent the oven from generating microwaves if the latch is released or if the door of the oven is opened. The FDA has stated that ovens that meet its standards and are used according to the manufacturer's recommendations are safe for consumer and industrial use. More information is available from: FDA's website for Radiation-Emitting Products.

The EPA has, in the past, considered developing federal guidelines for public exposure to RF radiation. However, EPA activities related to RF safety and health are presently limited to advisory functions. For example, the EPA chairs an a Radiofrequency Interagency Working Group, which coordinates RF health-related activities among the various federal agencies with health or regulatory responsibilities in this area.

OSHA is part of the U.S. Department of Labor, and is responsible for protecting workers from exposure to hazardous chemical and physical agents. In 1971, OSHA issued a protection guide for exposure of workers to RF radiation [29 CFR 1910.97]. However, this guide was later ruled to be only advisory and not mandatory. Moreover, it was based on an earlier RF exposure standard that has now been revised. At the present time, OSHA uses the IEEE and/or FCC exposure guidelines for enforcement purposes under OSHA's general duty clause (for more information see: www.osha.gov/SLTC/radiofrequencyradiation/).

NIOSH is part of the U.S. Department of Health and Human Services. It conducts research and investigations into issues related to occupational exposure to chemical and physical agents. NIOSH has, in the past, undertaken to develop RF exposure guidelines for workers, but final guidelines were never adopted by the agency. NIOSH conducts safety-related RF studies through its Engineering and Physical Agents Effects-hazards Branch in Cincinnati, Ohio and the Division of Applied Research and Technology (DART).

The NTIA is part of the U.S. Department of Commerce and is responsible for authorizing Federal Government use of the RF electromagnetic spectrum. Like the FCC, the NTIA also has NEPA responsibilities and has considered adopting guidelines for evaluating RF exposure from U.S. Government transmitters such as radar and military facilities. (Back to Index)

CAN LOCAL AND STATE GOVERNMENTAL BODIES ESTABLISH LIMITS FOR RF EXPOSURE?

In the United States, some local and state jurisdictions have also enacted rules and regulations pertaining to human exposure to RF energy. However, the Telecommunications Act of 1996 contained provisions relating to federal jurisdiction to regulate human exposure to RF emissions from certain transmitting devices. In particular, Section 704 of the Act states that, "No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions." Further information on FCC policy with respect to facilities siting is available from the FCC's Wireless Telecommunications Bureau

(see https://www.fcc.gov/general/tower-and-antenna-siting) and from "A Local Government Official's Guide to Transmitting Antenna RF Emission Safety." (Back to Index)

WHERE CAN I OBTAIN MORE INFORMATION ON POTENTIAL HEALTH EFFECTS OF RADIOFREQUENCY ENERGY?

Although relatively few offices or agencies within the Federal Government routinely deal with the issue of human exposure to RF fields, it is possible to obtain information and assistance on certain topics from the following federal agencies, all of which also have Internet Web sites.

FDA: The Food and Drug Administration's Cell phone website : http://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/
There are many pages listed at the FDA web site. Topics include:

- Wireless medical devices.
- General Electronic Product Radiation Control.
- FDA regulations that apply to manufacturers of electronic products

EPA: The Environmental Protection Agency's overview of power-line emissions: http://www.epa.gov/radtown/power-lines.html.

- Power lines:
- Cell phone safety:

OSHA: The Occupational Safety and Health Administration's Health and Safety Topics Non-ionizing Radiation.

NIOSH: The National Institute for Occupational Safety and Health's research on protecting workers from proven and possible EMF (electric and magnetic fields) health risks focusing on RF (radiofrequencies), ELF (extremely low frequencies) and Static magnetic fields: http://www.cdc.gov/niosh/topics/emf.

NCI: The National Cancer Institute's Fact sheets on potential risks from exposure to:

- Magnetic fields: http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/magnetic-fields-fact-sheet
- Cell phones: http://www.cancer.gov/about-cancer/causes-prevention/risk/radiation/cell-phones-fact-sheet.

NIEHS: The National Institute of Environmental Health Sciences' main page for electric and magnetic fields and potential health effects: http://www.niehs.nih.gov/health/topics/agents/emf/index.cfm

NTP: The National Toxicology Program's studies that:

- Test the biological effects of cellphones (GSM): http://ntp.niehs.nih.gov/testing/status/agents/ts-08013.html
- Test the biological effects of cellphones (CDMA): http://ntp.niehs.nih.gov/testing/status/agents/ts-08015.html

FCC: Questions regarding potential RF hazards from FCC-regulated transmitters can be directed to the Federal Communications Commission, Consumer & Governmental Affairs Bureau, 445 12th Street, S.W., Washington, D.C. 20554; Phone: 1-888-225-5322 (1-888-CALL-FCC); E-mail: rfsafety@fcc.gov.